

CLAIMS

1. A system for providing purified water to a point of use (POU) from a municipal water source or the like, which system comprises:
 - a plurality of individual modules each of which includes a separable head
 - 5 and a canister, each of said heads having liquid inlet and outlet passageways, and
 - means joining said heads of said plurality of modules one to another to create a composite manifold,
 - said heads being of substantially identical construction and said canisters being of substantially identical construction so that such can be inexpensively
 - 10 manufactured,
 - said canisters being hollow and having at least two interengaging sections including an upper section which mates with said head and a lower section,
 - said hollow canisters containing different operating units, with at least one of said units being a pump and another being a purification unit,
 - 15 said upper section of each of said canisters containing an adaptor that creates a desired liquid flow arrangement between said inlet and outlet passageways in said head and the respective operating unit in said canister, and
 - said modules in said composite manifold being interconnected for liquid flow between adjacent modules and being arranged so that said module containing said
 - 20 pump is upstream of said module containing said purification unit,
 - whereby any canister of any module, including that containing said pump, can be easily and quickly replaced with a substitute.
2. The system according to claim 1 wherein the upper section of each said canister is formed with a plurality of upwardly extending spigots and each of said
- 25 heads has formed, in its undersurface, a plurality of passageways which are proportioned and located to receive said spigots from any one said canister in sealing relationship therewith.
3. The system according to claim 2 wherein each of said spigots is tubular and of a circular cross section, and wherein each of said adaptors has a plurality of
- 30 hollow pegs which are received within passageways in a top section of said canister upper section leading to one of said spigots.

4. The system according to claim 1 wherein said pump canister includes a

centrifugal pump mounted atop an electric motor, wherein said internal adaptor in said pump canister carries a solenoid valve and a pressure sensor and wherein said liquid flow arrangement therein interconnects intake and discharge openings of said pump with said inlet and outlet passageways of the head of said pump module.

- 5 5. A system for providing purified water to a point of use (POU) from a municipal water source or the like, which system comprises:
- a plurality of individual modules, each of which includes a separable head and a canister, each said head having liquid inlet and outlet passageways,
- means joining said heads of said plurality of modules one to another to
10 create a composite manifold,
- said modules containing different operating units with said canister of one module containing a pump and drive motor and another said canister containing a main purification unit that includes a spirally wound crossflow reverse osmosis (RO) membrane element having a spiral feed passageway for feed flow axially therethrough,
15 which element produces a product water stream and a concentrate stream,
- an auxiliary water purification device designed to operate on municipal water pressure to produce a stream of purified water,
- a storage tank for storing purified water from said main purification unit when more purified water is being produced than is being removed from the system at
20 the POU,
- conduit means for delivering purified water from the outlet passageway in the head of said purification unit module to said storage tank,
- a reject conduit leading to drain which is connected to carry at least some of the concentrate stream from the RO element,
- 25 means for determining when said storage tank is substantially full,
- an inflow conduit network for supplying water from the source to the module containing said pump and to said auxiliary purification device,
- a flush conduit connecting a purified water outlet from said auxiliary purification device to an inlet passageway in the head of the module containing the main
30 purification unit, and
- a control unit interconnected with said determining means and said pump drive motor, which control unit is designed to, upon receipt of a signal from said determining means that said tank is full, halt operation of said pump motor, and initiate flow of water from said source to said auxiliary purification device, whereby purified

water from said auxiliary purification device flows through said flush conduit and axially through said spirally wound membrane element to flush the feed passageways.

5 6. The system according to claim 5 wherein a side conduit interconnects said outlet passageway from the main purification module and a drain and includes a drain valve, and wherein said control unit opens said drain valve upon receipt of said signal.

 7. The system according to claim 5 wherein said reject conduit contains a remote - controlled back pressure valve and wherein said control unit opens said downstream valve upon receipt of said signal.

10 8. The system according to claim 5 wherein a prefilter module having an inlet and an outlet is joined as a part of said composite manifold, which module is located upstream of said pump module and interconnected within said inflow conduit network, and wherein a solenoid-operated inflow valve is located in a conduit interconnecting said outlet of the prefilter module and said auxiliary purification device,
15 which valve is opened by said control unit to supply water to said device.

 9. The system according to claim 5 wherein a recirculation conduit is provided containing a recirculation valve, said conduit carrying a portion of said concentrate stream exiting said element to an inlet passageway in the head of the pump module.

20 10. The system according to claim 5 wherein a postfilter module is interconnected as part of said composite manifold and wherein said conduit means leading to said storage is tank interconnected with the head of said postfilter module.

 11. The system according to claim 10 wherein said storage tank conduit means includes a total dissolved solids (TDS) monitor which is connected to the control
25 unit.

 12. The system according to claim 11 wherein a line leading to the POU contains a volumetric flow sensor that is connected to the control unit.

 13. The system according to claim 12 wherein a product volumetric flow

sensor which is connected to the control unit monitors the outlet flow of purified water from said main purification module.

14. The system according to claim 13 wherein a reject conduit that includes a volumetric drain sensor which is connected to said control unit carries at least a portion
5 of the concentrate stream to drain.

15. The system according to claim 14 wherein the control unit includes a data communication linkage to an off-site computer monitor system, which off-site system is designed to evaluate data received from said control unit by comparing such received data with standards and to decide, based upon such evaluation, whether any module in
10 the operating system is not performing and, if so, to accordingly dispatch a serviceperson with a substitute module.

16. A system for providing purified water to a point of use (POU) from a municipal water source or the like, which system comprises:

a pump and drive motor which are connected to supply water from such
15 source to a main purification unit that includes a spirally wound crossflow reverse osmosis (RO) membrane element having a spiral feed passageway for feed flow axially therethrough, which element produces a product water stream and a concentrate stream,
an auxiliary water purification device designed to operate on municipal water pressure to produce a stream of purified water,
20 a storage tank for storing purified water from said main purification unit when more purified water is being produced than is being removed from the system at the POU,
product conduit means for delivering purified water from said main purification module to said storage tank and to said POU,
25 means for determining when said storage tank is substantially full, and
control means for halting operation of said pump motor and initiating flow of water from said source to said auxiliary purification device upon such determination, whereby purified water from said auxiliary purification device is then caused to flow axially through said spirally wound membrane element to flush the feed
30 passageway therein.

17. The system of claim 16 which includes an inflow conduit network for

supplying water from the source to the module containing said pump and to said auxiliary purification device, and

- 5 a flush conduit connecting a purified water outlet from said auxiliary purification device to an inlet passageway to the main purification unit, and wherein said control means includes a control unit interconnected with said determining means and said pump drive motor, which control unit is designed to, upon receipt of a signal from said determining means that said tank is full, halt said motor.

18. A system according to claim 17 wherein a reject conduit is provided to deliver at least a portion of said concentrate stream from said element to drain and
10 contains a remotely operable valve and wherein said control means opens said valve and said reject conduit leading to drain when water is supplied to said auxiliary purification device.

19. A system according to claim 17 wherein a bypass conduit interconnects the purified water outlet of said auxiliary purification device through a remotely operable
15 bypass valve to said storage tank and wherein said control unit is operable to open said valve in said bypass conduit and supply water from said auxiliary purification device to said storage tank if, for whatever reason, said pump cannot supply water to said main purification unit.

20. The system according to claim 17 wherein the purified water product
20 outlet from said main purification unit is linked to the drain through a remotely operated drain valve and wherein said drain valve is opened by said control unit when water is supplied to said auxiliary purification device.